

Appl. No. 10/784,804
Reply to Office action of October 13, 2005

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for annealing a doped layer on a substrate, comprising:
depositing a polycrystalline layer ~~to gate oxide layer on a substrate~~;
implanting the polycrystalline layer with a dopant to form a doped polycrystalline layer ~~containing a dopant concentration within a range from about 1×10^{19} atoms/cm³ to about 1×10^{21} atoms/cm³~~;
exposing the doped polycrystalline layer to a rapid thermal anneal; and
~~exposing~~ ~~heating~~ the doped polycrystalline layer to ~~a temperature of about 1,050°C or greater~~ during a laser anneal.
2. (Cancelled) ~~The method of claim 1, wherein the polycrystalline layer comprises at least one element selected from the group consisting of silicon, germanium, carbon and combinations thereof.~~
3. (Cancelled) ~~The method of claim 2, wherein the dopant is selected from the group consisting of boron, phosphorous, arsenic and combinations thereof.~~
4. (Cancelled) ~~The method of claim 3, wherein the doped polycrystalline layer has a dopant concentration from about 1×10^{19} atoms/cm³ to about 1×10^{21} atoms/cm³.~~
5. (Currently Amended) The method of claim [[4]] 1, wherein ~~the substrate is heated during the rapid thermal anneal is at a temperature from about 900°C to about 1,200 1,000°C and last for a time period within a range from about 1 second to about 10 seconds.~~

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6. (Currently Amended) The method of claim [[4]] 1, wherein the laser anneal is at a temperature is within a range from about 1,050°C 1,000°C to about 1,415°C 1,400°C during the laser anneal.
7. (Original) The method of claim 6, wherein the laser anneal last for about 500 milliseconds or less.
8. (Currently Amended) The method of claim 7, wherein the doped polycrystalline layer has an electrical resistivity of less than about 400 ohms/cm².
9. (Currently Amended) A method for annealing a layer on a substrate, comprising:
depositing a polycrystalline layer containing a lattice to the on a substrate;
doping the polycrystalline layer with at least one a dopant element to form a doped polycrystalline layer;
annealing the doped polycrystalline layer during a rapid thermal anneal; and
annealing heating the doped polycrystalline layer with to a temperature of about 1,050°C or greater during a laser anneal to incorporate the at least one dopant element into the lattice for about 500 milliseconds or less.
10. (Cancelled) The method of claim 9, wherein the polycrystalline layer comprises at least one element selected from the group consisting of silicon, germanium, carbon and combinations thereof.
11. (Currently Amended) The method of claim 9, wherein the dopant element is selected from the group consisting of boron, phosphorous, arsenic and combinations thereof and the doped polycrystalline layer has a dopant concentration within a range from about 1×10¹⁹ atoms/cm³ to about 1×10²¹ atoms/cm³.
12. (Cancelled) The method of claim 11, wherein the doped polycrystalline layer has a dopant concentration from about 1×10¹⁹ atoms/cm³ to about 1×10²¹ atoms/cm³.

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13. (Cancelled) ~~The method of claim 12, wherein the doped polycrystalline layer is exposed to a rapid thermal anneal prior to the laser anneal.~~

14. (Currently Amended) The method of claim 13 11, wherein the substrate is heated during the rapid thermal anneal is at a temperature from about 800°C to about 1,400 1,000°C and last for a time period within a range from about 2 seconds to about 20 seconds.

15. (Currently Amended) The method of claim 12 9, wherein the laser anneal is at a temperature is within a range from about 1,050°C 1,000°C to about 1,415°C 1,400°C during the laser anneal.

16. (Currently Amended) The method of claim 15, wherein the laser anneal last for about 500-100 milliseconds or less.

17. (Currently Amended) The method of claim 16, wherein the doped polycrystalline layer has an electrical resistivity of less than about 400 ohms/cm².

18. (Currently Amended) A method for annealing a doped silicon layer on a substrate, comprising:

depositing a polycrystalline layer ~~to the~~ on a substrate;

doping the polycrystalline layer with ~~at least one dopant element~~ boron to form a doped polycrystalline layer;

exposing the doped polycrystalline layer to a rapid thermal anneal at a first temperature; and

exposing the doped polycrystalline layer to a laser anneal at a second temperature of about 1,050°C or higher for about 500 milliseconds or less from about 1,000°C to about 1,415°C.

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19. (Cancelled) ~~The method of claim 18, wherein the polycrystalline layer comprises at least one element selected from the group consisting of silicon, germanium, carbon and combinations thereof.~~

20. (Cancelled) ~~The method of claim 19, wherein the dopant is selected from the group consisting of boron, phosphorous, arsenic and combinations thereof.~~

21. (Currently Amended) The method of claim 20 18, wherein the doped polycrystalline layer has a dopant boron concentration within a range from about 1×10^{19} atoms/cm³ to about 1×10^{21} atoms/cm³.

22. (Currently Amended) The method of claim 21, wherein the first temperature is from about 800°C to about 1,400 1,000°C and last the substrate is heated for a time period within a range from about 2 seconds to about 20 seconds.

23. (Currently Amended) The method of claim 22 21, wherein the laser anneal last for about 500 100 milliseconds or less.

24. (Currently Amended) The method of claim 23, wherein the doped polycrystalline layer has an electrical resistivity of less than about 400 ohms/cm².

25. (Currently Amended) A method for annealing a layer on a substrate, comprising:
~~depositing a doped polycrystalline layer containing a lattice to the on a substrate, wherein the doped polycrystalline layer has a dopant concentration within a range from about 1×10^{19} atoms/cm³ to about 1×10^{21} atoms/cm³, exposing the doped polycrystalline layer to a rapid thermal anneal; and annealing heating the doped polycrystalline layer to a temperature of about 1,050°C or greater during with a laser anneal to incorporate the at least one dopant element into the lattice provide an electrical resistivity of about 400 ohms/cm² or less for the doped polycrystalline layer.~~

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26. (Cancelled) ~~The method of claim 25, wherein the doped polycrystalline layer comprises at least one element selected from the group consisting of silicon, germanium, carbon and combinations thereof.~~

27. (Currently Amended) The method of claim 26 25, wherein the doped polycrystalline layer comprises a dopant element selected from the group consisting of boron, phosphorous, arsenic and combinations thereof concentration within a range from about 1×10^{20} atoms/cm³ to about 5×10^{20} atoms/cm³.

28. (Cancelled) ~~The method of claim 27, wherein the doped polycrystalline layer comprises the dopant element with a concentration about 1×10^{19} atoms/cm³ to about 1×10^{21} atoms/cm³.~~

29. (Cancelled) ~~The method of claim 28, wherein the doped polycrystalline layer is exposed to a rapid thermal anneal prior to the laser anneal.~~

30. (Currently Amended) The method of claim 29 27, wherein the substrate is heated during the rapid thermal anneal is at a temperature from about 800°C to about 1,400 1,000°C and last for a time period within a range from about 2 seconds to about 20 seconds.

31. (Currently Amended) The method of claim 30 27, wherein the laser anneal is at a temperature is within a range from about 1,050°C 1,000°C to about 1,415°C 1,400°C during the laser anneal.

32. (Original) The method of claim 31, wherein the laser anneal last for about 100 milliseconds or less.

33. (Cancelled) ~~The method of claim 32, wherein the doped polycrystalline layer has an electrical resistivity less than 400 ohms/cm².~~

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34. (New) The method of claim 1, wherein the temperature is about 1,350°C during the laser anneal.

35. (New) The method of claim 1, wherein the temperature is less than about 1,415°C during the laser anneal.

36. (New) The method of claim 9, wherein the temperature is about 1,350°C during the laser anneal.

37. (New) The method of claim 9, wherein the temperature is less than about 1,415°C during the laser anneal.

38. (New) The method of claim 18, wherein the temperature is about 1,350°C during the laser anneal.

39. (New) The method of claim 18, wherein the temperature is less than about 1,415°C during the laser anneal.

40. (New) The method of claim 25, wherein the temperature is about 1,350°C during the laser anneal.

41. (New) The method of claim 25, wherein the temperature is less than about 1,415°C during the laser anneal.

42. (New) The method of claim 7, wherein the doped polycrystalline layer contains a boron concentration within a range from about 1×10^{20} atoms/cm³ to about 5×10^{20} atoms/cm³.

43. (New) The method of claim 16, wherein the doped polycrystalline layer contains a boron concentration within a range from about 1×10^{20} atoms/cm³ to about 5×10^{20} atoms/cm³.

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44. (New) The method of claim 21, wherein the boron concentration is within a range from about 1×10^{20} atoms/cm³ to about 5×10^{20} atoms/cm³.

45. (New) The method of claim 25, wherein the temperature is within a range from about 1,050°C to about 1,400°C for about 100 milliseconds or less during the laser anneal.